Volume 2 | Number 2 Article 6

4-1-1941

Sorghum

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SORGHUM

Sweet Varieties Prove Superior to Grain Types for Fodder and Silage

IOWA FARMERS have been taking an increased interest in sorghum the last few years. There were 177,000 acres of sweet sorghum in Iowa in 1940, four times as much as during the average year from 1929 to 1938.

The two main reasons for increased interest in sorghum in Iowa are: (1) Sorghum withstands drouth well and (2) makes good silage or fodder. A lot of the sorghum grown in Iowa has been cut and put into silos that once were filled with corn silage. (This has resulted in part from the AAA programs which have limited corn acreage.)

Because sorghum is a relatively new crop in Iowa, many farmers want information about it. They raise many questions about varieties and how to grow and handle the crop.

Since sorghum in Iowa is used as a forage crop and largely as a silage crop, the sweet varieties are preferred. Sorghums fall into two main types: Grain sorghums and sweet sorghums. The grain sorghums have been bred to produce grain; their stalks are inclined to be short, the pith dry and low in sugar content. The sweet sorghums are best for forage because of their sweet, juicy stalks and high total tonnage of fodder. Our tests indicate that grain sorghums cannot compete successfully with corn in producing grain in Iowa. We do not recommend growing sorghums for grain in Iowa, particularly because the better yielding varieties are too late in maturity for Iowa conditions.

Last year (1940) we compared six sorgos (sweet sorghum varieties are commonly referred to as sorgos), six grain sorghums and one variety of corn at the Iowa Station. The plots were harvested for silage when the seeds were in the medium to hard dough stage. Representative plots were left to mature and harvested for seed when completely ripe. Yields of green forage and of mature dry seed and the average height of plots are given in table 1.

In comparing varieties of sorghum with each other and with corn for silage the tonnage of green forage is not the only thing to consider. The time of maturity, the comparative protein and carbohydrate content, the percentage of grain and the digestibility of the stalks and grain, as well as the ease of handling the fodder, are all important.

The Honey variety, which produced the highest yield of green forage, is popular for sirup in Texas but is not considered as good for silage or fodder even in Texas because it is relatively high in moisture content and somewhat difficult to harvest. The Atlas sorgo produced 25 tons of forage and three times as much seed as Honey. Atlas is considered the best variety for silage where it will mature sufficiently.

In this experiment, corn, which yielded 19 tons of forage and 5,550 pounds of grain per acre, was nearly equal to any of the sorghums in the test and was definitely better than most of them. The highest yielding grain sorghum variety, New Grain (Grohoma), which matured 3 weeks later than corn, yielded less forage than Atlas or Honey and less grain than corn. The Waconia Orange, which produced 21 tons of green forage, was ready for the silo 3 weeks earlier than either Atlas or Honey.

All varieties of sorghum represented in the variety test at Ames were grown in demonstration plots in 17 counties in the state in 1940. Observations on the plant height, percent lodging, date ready for silage, relative yield as compared with corn and order of choice for use as a silage crop were made by the county extension agents in the counties in which the tests were located. A summary of these observations is given in table 2.

Averaging the results of the 17 county tests (grouping them according to location into northern and southern Iowa tests), the Waconia Orange and Leoti Red ranked first and second choice in northern Iowa. Atlas and Honey outyielded Waconia Orange, but we believe Atlas and Honey are too late in maturity to be safe for northern Iowa. For southern Iowa, Atlas ranked first, Honey second and New Grain (Grohoma) third, with Waconia Orange and Leoti Red as fourth and fifth choices. These sorghum varieties appeared to have a considerably greater relative yield advantage over corn in southern Iowa than in the northern half of the state.

Varieties Recommended

From the data available, and from the accumulated experiences of many Iowa farmers, we consider Atlas sorgo the best variety for silage in central and southern Iowa. While it is too late in maturity to ripen seed dependably, it has produced high yields of forage year after year. Atlas is resistant to lodging and has white seed which is considered more palatable to livestock than the colored seed of many of the other varieties. The Honey and Leoti Red varieties gave excellent results in the 1940 trials, but these varieties should be tested further before we can be sure about recommending them.

For northern Iowa the Waconia Orange is our first choice. It produces high yields of forage and matures satisfactorily. It also has sweet stalks, and has proved extremely desirable for sirup manufacture. The Early Sumac and various strains of Black Amber also are acceptable for the northern half of Iowa. In 1940 the Leoti Red and Atlas also produced good results in this area, but in most years these two varieties probably would be too late in maturity, especially in the two northern tiers of counties.

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Description of Varieties

ATLAS

Atlas sorgo was developed by selection from a cross between Sourless sorgo and Blackhull Kafir. It is a popular variety in Kansas, Nebraska, Oklahoma, Missouri and Iowa. Atlas is tall and late in maturity, too late to produce dependable seed yields in Iowa in most years. It has the sweet, juicy stalk of the sorgo parent and the strong stalk and white seed characteristic of the kafir parent. Atlas is resistant to lodging, somewhat resistant to chinch bugs—as are most of the sweet sorghums—and produces high yields of forage.

WACONIA ORANGE

Several strains of the Orange variety are grown extensively for forage and sirup, including Kansas Orange, Sourless sorgo and Waconia Orange. Waconia Orange is earlier in maturity than Kansas Orange and is well adapted to conditions in northern and central Iowa. Under favorable conditions Waconia Orange grows to a height of 8 feet, and is noted particularly for its sweet stalk, desirable for sirup manufacture as well as for forage purposes. This variety is characterised by having yellowish-brown seed and bright red chaff.

TABLE 1. SORGHUM VARIETY TRIALS, AMES, 1940.

Variety and type	Production for silage[1]			Seed production		Height in feet
	Date cut for silage	Green weight in tons per acre	Percent of dry matter in forage	Date seed mature[2]	Dry weight in pounds per acre	
Honey (sweet)	Sept. 26	33.07	25.0	Oct. 11	1043	11
Atlas (sweet)	Sept. 26	25.08	28.6	Oct. 18	3135	8½
Leoti Red (sweet)	Sept. 26	21.75	31.6	Oct. 8	3076	8
Early Sumac (sweet)	Sept. 12	21.09	27.9	Sept. 26	3333	6½
Waconia Orange (sweet)	Sept. 4	21.15	26.9	Sept. 18	2488	8
New Grain (Grohoma) (grain)	Sept. 26	20.03	31.9	Oct. 18	4481	6½
Corn, U.S. 44	Sept. 12	18.98	33.5	Sept. 26	5550	7
Grohoma (grain)	Sept. 26	18.48	33.0	Oct. 18	4435	6½
Black Amber (sweet)	Aug. 21	15.74	28.8	Sept. 12	3590	6
Western Blackhull Kafir (grain)	Sept. 12	15.41	31.6	Sept. 26	3432	6
Hegari (grain)	Aug. 21	13.79	29.7	Sept. 12	3069	4½
Sooner Milo (grain)	Aug. 21	13.63	25.5	Sept. 12	2303	4
Early Kalo (grain)	Aug. 21	11.78	26.5	Sept. 12	2858	4

[1]Cut for silage when seed was in the medium to hard dough stage.
[2]Varieties maturing much later than Oct. 1 are not dependable for seed production.

TABLE 2. SUMMARY OF REPORTS FROM 17 COUNTIES ON SORGHUM VARIETY DEMONSTRATION PLOTS, 1940.

Variety and type	Height in feet	Lodging in percent	Date ready for silo—September	Yield estimate in percent of corn		Order of choice for silage	
				Northern Iowa	Southern Iowa	Northern Iowa	Southern Iowa
Atlas (sweet)	8.3	0.5	27	119	144	4	1
Waconia Orange (sweet)	7.5	0.8	23	108	129	1	4
Honey (sweet)	9.5	0.7	27	114	133	8	2
Leoti Red (sweet)	8.2	1.0	24	117	134	2	5
New Grain (Grohoma) (gr.)	6.2	5.1	25	104	112	5	3
Grohoma (grain)	6.4	4.7	26	103	122	7	6
Early Sumac (sweet)	6.6	1.8	23	98	128	3	7
Black Amber (sweet)	6.9	3.3	18	87	106	9	10
Hegari (grain)	5.3	2.5	18	73	115	6	8
West. Blackhull Kafir (gr.)	6.1	0.2	27	88	111	10	9
Early Kalo (grain)	4.1	0.2	18	33	75	12	11
Sooner Milo (grain)	4.5	1.0	18	49	63	11	12

It is very similar to, if not identical with, Rox Orange, a strain released by the Wisconsin Station a number of years ago.

HONEY SORGO

Honey sorgo is a popular sirup variety in Texas and is grown only to a limited extent in the northern states. It is late in maturity, extremely tall, with large, open, bushy heads. Although seed yield is low, under conditions favorable for full-season growth, Honey produces high yields of green forage.

EARLY SUMAC

An early maturing strain of the popular Sumac variety, the Early Sumac, matures successfully in Iowa. It has short, compact heads with small reddish-brown seeds.

Atlas Sorgo, shown below, has proven to be well adapted for fodder and silage in central and southern Iowa, but matures too late to be considered safe for the northern part of Iowa.

Waconia Orange is the variety shown below. It is especially desirable in northern Iowa for fodder and silage. It also has been proven an excellent variety for sirup.

While it does not grow as tall as Waconia Orange, it has been a dependable forage producer.

BLACK AMBER

This variety includes a number of strains, Minnesota Amber, Waconia Amber, Dakota Amber, Ames Amber and Early Amber. A midseason variety for Iowa, Black Amber has slender stalks with few leaves. The heads are loose and open, with the light brown seeds enclosed in a black, shiny, bearded chaff. The various strains of Amber have been popular for sirup as well as for forage.

LEOTI RED

This variety, of unknown origin, has been tested by the Kansas Agricultural Experiment Station and is known for its good forage quality and resistance to red spot diseases. It is grown extensively in Kansas and Nebraska but has been grown in Iowa only to a very limited extent.

GROHOMA, OR "NEW GRAIN"

First distributed to farmers in 1929, this grain sorghum has been grown but to a limited extent. While its origin is somewhat obscure, it is believed to have been developed from a cross between feterita and some sorgo. It has a dry but sweet stalk, grows to a height of from 4 to 6 feet, has broad, wrinkled leaves, large, loose, elongated heads, brown seeds and a rather high percentage of chaff. Grohoma is susceptible to covered kernel smut and to lodging. This variety is not uniform, off-type segregates appearing frequently. Seed ripens too late to make it a dependable crop for grain, but under favorable conditions yields of forage are fairly high.

Recent interest in Grohoma developed through the planting of a variety sold as "New Grain." Investigations have shown that this crop was originally sold into Iowa from Illinois as "a new grain and forage crop (Grohoma)." The term "new grain" appeared to have some appeal and many farmers are now growing Grohoma sorghum under the name "New Grain."

Growing the Crop

The sorghum seedling isn't as sturdy as the young corn plant; it is inclined to be spindling. The seedbed should be fitted well in advance of planting, the final fitting being delayed until just before planting in order to get rid of as many weeds as possible. Planting should be delayed until the soil is warm and all danger of frost is past. May 20 to 25 is about the best time to plant in central Iowa in most years. The crop is handled in all ways as corn would be grown. Sorghum or "cane" plates should be used in the planter for best results in getting a uniform stand, planting 6 to 8 pounds of seed per acre.

Ensiling Sorghum

The crop is ready to cut either for silage or fodder when the seeds are in the medium to hard dough stage. If silage is made of immature sorghum too much acid develops, giving the silage a strong flavor and odor. Such silage also usually has too much moisture, and cows do not like it. Thus care should be taken to select a variety that will mature.

If the sorghum does fail to mature, better silage can be made if the plants are wilted to get rid of part of the moisture before it is cut into the silo. One must use care not to allow the sorghum to get too dry, for silage needs enough moisture to pack properly and prevent mold.

As a general rule sorghum silage is less coarse than corn silage and therefore is easier to pack in the silo. If properly made it has a slightly greener appearance than corn silage and an aroma that is pleasing. Poorly made silage usually has a sharp, irritating smell.

The sorghums are particularly good for refilling silos in the winter since they do not deteriorate in feeding value as much as many other crops when exposed to winter weather. Whenever the silo is filled with dry sorghum it is necessary to add ample water to the chopped crop (about 2 to 2½ times by weight as much water as dry sorghum), otherwise the silage is apt to be moldy.

The sorghums dry much more slowly than most of the forage crops because the stems are large and juicy. Rains do not greatly damage the leaves of sorghums while curing, and few are lost during this period. Care must be taken to cure thoroughly the sorghum fodder in shocks or windrows before it is stacked or stored in the barn or else it will mold and spoil.

Feeding Sorghum

The feeding value of sorghum fodder is similar to corn fodder. When properly prepared, sorghum silage ranks slightly below corn silage as a dairy feed. This is because it usually contains more moisture—though on a dry-matter basis the two feeds are nearly equal. There apparently is little difference in feeding value (dry-matter basis) between silages made from the different varieties of sorghum.

Supplemental grains, for feeding with sorghum fodder and sorghum silage to dairy cattle, should be approximately the same as those used for supplementing corn fodder and corn silage.

Effect on Milk, Health

Sorghums under certain conditions may cause the death of stock pastured on it from prussic or hydrocyanic acid poisoning. Green shoots and leaves of young, rapidly growing sorghum plants, and particularly the second-growth sprouts or suckers which come up following a dry or semi-dormant period, or after a frost, are likely to be dangerous.

Most deaths have occurred when cattle are pasturing the sorghum, though recent experiments indicate that the plant may retain the poisonous properties when dried or ensiled. Because only matured plants are usually used for fodder or silage they cause no losses when fed.

Sorghum silage may be troublesome in causing off-flavored milk because it often develops strong acid aromas. Milk flavors are intensified when large quantities of an offending feed are fed, or when the feed is fed shortly before milking.

To lessen such trouble feed sorghum silage right after milking and, if it is strongly acid, feed less than usual amounts. Since flavors can be absorbed directly by the milk, the silage odors should be kept away from it by feeding the silage in outside bunks or in well-ventilated barns.